

# Public Transportation's Role in Responding to Climate Change

## Slide 1: Title Slide

Emma Zinsmeister: We have Tina Hodges and Andrea Martin from the U.S. Department of Transportation's Federal Transit Administration. Tina is a Program Analyst and a former Presidential Management fellow in the Office of Budget and Policy at FTA. She's conducting policy research and outreach on transportation and climate change. She also serves as the core team member of DOT's Center for Climate Change and Environmental Forecasting and she's the subject matter lead for the Center's report to congress on strategies for reducing greenhouse gas emissions from transportation. She has a Master's in Public Policy and a Bachelor's in Government and Politics both from the University of Maryland.

Andrea Martin is an Environmental Protection Specialist at FTA and she focuses on American Recovery and Reinvestment Act projects and issues. She has a Masters from the University of Phoenix and her undergraduate degree from the University of Rhode Island. She majored in Natural Resource and Environmental Management. Prior to joining FTA, she worked for AECOM in Phoenix as a National Environmental Policy Specialist and Environmental Planner. So, with that, Tina, I guess you can take it away.

Tina Hodges: Thanks, Emma. So this is Tina Hodges from the Federal Transit Administration and what I'm going to discuss today is how public transportation can play a role in responding to climate change. I'll also discuss tools and resources from FTA on reducing greenhouse gas emissions and improving air quality. And then, my colleague Andrea Martin will talk about some planning, technical assistance tools that we have as well as grant programs.

## Slide 2: Avoiding Carbon Emissions

Tina Hodges: So, first of all, the basic concept that we're talking about is, of course, very simple. These photos show 40 commuters traveling by car and 40 commuters traveling by bus, so you can see visually that by moving more people in fewer vehicles, transit can reduce total emissions, and transit can maximize this benefit by minimizing its own emissions. But of course, it's always nice to see the data behind it.

## Slide 3: CO<sub>2</sub> Emissions per Passenger Mile

Tina Hodges: So luckily, through the National Transit database, FTA, the Federal Transit Administration, collects data on passenger miles traveled and electricity, diesel and other energy consumption from transit agencies across the country. This, combined with standard emission factors from the Department of Energy and EPA, allow us to calculate transit's greenhouse gas emissions per passenger mile and compare it to that of automobiles. So, as you can see on this graph, heavy rail transit such as subways and metros produce, on average, 76 percent lower greenhouse gas emissions per passenger miles than driving alone.

For light rail, that figure is 62 percent less, 33 percent less for bus and about half for the average for transit. But these are national average. They include near empty buses along with the standing room only ones, and as such, these averages mask considerable variability.

#### Slide 4: Pounds CO2/passenger mile for US Heavy Rail Systems

Tina Hodges: This graph shows the greenhouse gas emissions per passenger mile for U.S. heavy rail systems, subways or metros, and they're ordered from the highest number of annual passenger miles to the lowest. So, those on the left, such as New York, D.C. and San Francisco account for a much higher percent overall U.S. transit than those on the right. So, you can see that some systems have higher or lower emissions than others.

#### Slide 5: From National Average to Local Specific

Tina Hodges: These three main variables that influence the carbon intensity of transit are the efficiency of the vehicle. So, that is the, you know, a hybrid bus versus a diesel bus for instance in terms of the miles per gallon that those buses are getting, or heavier or lighter railcars for the subways and metros, or regenerative braking, or used in both rail or bus, through using that, that will be more efficient.

The second variable is ridership, so, the percent of seats that are filled on the vehicle. And then the third is the carbon intensity of the fuel or electricity, so, are they using diesel, biodiesel, compressed natural gas. And then for the rail systems, which are mostly electric, is that electricity is sourced from coal, or hydroelectric, or nuclear, et cetera.

And, if you want to, you can go to this link down at the bottom of the slide here and check out the carbon intensity of the transit agency in your local area. So, the bus systems, because there are so many, I only have the top 50. But if you're not in the 50 largest systems, then you can email me and I can send you the results for all 400 or so bus systems. And you can find your particular one there.

#### Slide 6: Optimizing Land Use

Tina Hodges: The other thing to note is that studies show that transit land use effect have an even greater impact on reducing greenhouse gas emissions than transit efficiency over the private auto. So, transit-oriented development and the denser urban forms facilitated by having transit available, means that people don't need to travel that far to get to their destination.

So, combining transit and support of land use policies offers synergies that increase each strategy's impact. So in other words, by having transit around, you make the land use more effective. And by having land use policies, you make transit more effective because it's easier to serve the population. And there are some studies on these effects. So for instance, the Growing Cooler Study found that compact development reduces driving by 20 to 40 percent.

#### Slide 7: Optimizing Land Use (cont.)

Tina Hodges: And another study by the Center for Neighborhood Technology looked at households living in areas with access to transit and found that they produce much lower greenhouse gas emissions from transportation. In fact, those in the highest location efficient transit zone had an average household greenhouse gas emission level from transportation that was 78 percent lower than the average for the census block group.

Another study from the transportation, pardon me, the Transit Cooperative Research Program, study number 128, "Effects of TOD on Housing, Parking and Travel", surveyed 17 Transit-Oriented Development Housing Project – Projects. And found that they average 44 percent fewer vehicle trips than that estimated by the Institute for Traffic Engineers' manual. So, in other words, these types of development, they are sometimes required to provide a much higher level of parking than is actually necessary because people are looking at the ITE manual which over-estimates the amount of parking that's needed because it doesn't incorporate the fact that transit is available in these areas.

#### Slide 8: Optimizing Land Use (cont.)

Tina Hodges: The Moving Cooler Study, looked at a bundle of strategies, looked at combining land use, public transportation, and pedestrian and bicycle strategies, and found that this combination of strategies could reduce greenhouse gas emission by 9 to 15 percent below baseline in 2050. They also looked at several pricing strategies and adding pricing strategies, such as the gas tax, DMTC and Pay-As-You-Drive insurance, on top of those strategies, would actually double the impact.

#### Slide 9: U.S. Transit CO<sub>2</sub> Savings – ICF Report

Tina Hodges: A report by ICF for the Transit Cooperative Research Program found that when you take together all of these different effects of transit so the effect of transit use rather than driving, and then, add to that the land use effect, as well as, the congestion mitigation effects, and subtract out the greenhouse gas emissions from the energy used by transit, then the net savings are 37 million metric tons of carbon dioxide nationwide.

#### Slide 10: Tool for tracking GHG savings from transit

Tina Hodges: This is some information on a couple of tools that you can use for tracking greenhouse gas emissions savings from transit in your local community. The Federal Transit Administration funded the American Public Transportation Association to develop a recommended practice for quantifying greenhouse gas emissions from transit. This graphic here shows the different things that are considered in this recommended practice. So, it looks at both the emissions produced by transit, so from burning the fuel, or using electricity, from keeping the lights on in the administrative offices, and also the emissions that's displaced by transit. So, the emissions that do not occur because public transportation is providing an alternative to a car trip and is also providing congestion relief and facilitating compact land use. The group is – the APTA Climate Change Working Group, that developed

this methodology, is now working on a method for determining the impact of transit on land use for different types of communities.

Basically, the study, that I mentioned earlier, developed a national average land use multiplier of about two. So that means that land – the effect of transit on land use is about twice the effect of just the emissions reductions from mode shift alone. But, this of course – the land use effects varies by community because some communities are obviously much more dense or have more extensive transit service than others. So the group is looking at specifying that for different types of communities.

Then, there is a Transit Cooperative Research Program Synthesis Study that came out just last week called Current Practices and Greenhouse Gas Emission Savings from Transit. And that synthesizes a lot of the existing literature and information and case studies on public transportation's role in responding to climate change.

#### Slide 11: Map

Tina Hodges: The Center for Neighborhood Technology's Housing and Transportation Affordability Index, has a really fun mapping tool. At least I get a lot of fun playing with – out of playing with it. And you can go on there and click on your – the name of your local community and they have a few, a large number in there. It's not just the big metro areas, but a large stock of the urbanized areas in the U.S.

And so, you can click on your area and then see a map of various things. But one of the types of maps that you can see is carbon dioxide emissions per household from household car use. So, this is the map for Washington D.C., and as you can see here, the red areas are those with very high carbon dioxide emissions per household from transportation and those tend to be the outlying areas or further from the core and the yellow areas are those with lower emissions.

And as you can see here, the dark lines radiating outward, those are the metro rail lines. So, you can see that those yellow, low emission areas tend to follow those metro rail lines, because people in that area are able to take the metro instead of driving. So that's a neat correlation that you can see with these types of graphs.

#### Slide 12: Minimizing its Own Impact

Tina Hodges: There's a lot that public transportation agencies can do to minimize their own carbon footprint in addition to minimizing the carbon footprint of their community as a whole. So, for example, the transit agencies across the U.S. are purchasing hybrid buses and they're also obtaining LEED certification for maintenance facilities and offices. The new Light Rail System in Phoenix uses regenerative braking to save energy. Another example, Boston's transit agency is installing wind turbines on some of its properties. So, there are a lot of exciting things that are going on.

#### Slide 13: Tool for Reducing Transit GHGs

Tina Hodges: Here are some tools that FTA has worked on for helping public transportation agencies reduce their carbon footprint. We're developing a transit carbon management compendium and this is a handbook for transit agency managers on local governments on how to reduce energy, and emission, intensity of transit.

So, this compiles the result of the FTA research on alternative fuel and fuel efficiency transit vehicles as well as outside analysis. It's being produced by Georgia Tech; and stay tuned, it will be out in the next couple of months. FTA has also just issued a call for additional transit agencies who would be interested in environmental management systems training. FTA previously offered two rounds of this type of training and got a very good response and, so now, is offering the third round. Then there is the TIGGER program which was funded with \$100 million in 2009 under the American Recovery and Reinvestment Act and is funded for FY 2010 under general appropriations for \$75 million. And this is for capital grants to reduce energy and greenhouse gas emissions from public transportation. So, at this point, I will turn it over to my colleague, Andrea.

#### Slide 14: Partnership for Sustainable Communities

Andrea Martin: Thank you. I'm going to talk a little bit about partnerships for sustainable communities as well as grant programs offered here through FTA. In June 2009, the Partnership for Sustainable Communities was formed by the U.S. Department of Housing and Urban Development, HUD, the U.S. Department of Transportation, DOT, and the U.S. Environmental Protection Agency, EPA.

Basically, what they've done is pledge to ensure housing and transportation goals are met while simultaneously protecting the environment, promoting equitable development and helping address the challenges of climate change. And the principles are: provide more transportation choices; promote equitable, affordable housing; enhance economic competitiveness; support existing communities; coordinate and leverage federal policies and investment; and value communities and neighborhood. And I'll talk a little bit about how we do that here at DOT.

#### Slide 15: Sustainable Communities Partnership Funding Opportunities

Andrea Martin: OK, Sustainable Communities Partnership funding opportunities, there's the HUD and, actually, the HUD has two main programs; Sustainable Community Planning Grants and Sustainable Community Challenge Grants. And the notice for funding availability has been announced yesterday in partnership with the U.S. DOT. Through the American Recovery Investment Act, the Department of Transportation was able to have or initiate programs that support livability and sustainable communities. Through that, we have some that I'll talk about in just a minute. Here at FTA, we have TIGER One, which was at DOT, our Secretary Ray LaHood's program. The TIGER 2 capital and planning grant that was actually the notice of funding availability, yesterday, it was announced with the HUD program in the Federal Register.

We have an urban circulator program here at FTA as well as bus livability and our TIGER and Clean Fuels Program, and I'll go through them as well. And in the beginning of the session today, they talked a little bit about at EPA their programs, Smart Growth, Sustainable Communities Brownfields; Clean Water State Revolving Fund and Targeted Watershed Grants.

#### Slide 16: Recent Partnership Successes

Andrea Martin: OK, recent partnership successes, we have the HUD Affordable Housing on Brownfields, the DOT-FTA New Start Cost Effectiveness – and I'll talk a little bit about that in a minute – DOT which is FTA Affordable Housing Near Transit Guide that was put together. Then we have the DOT FHWA, which is Federal Highways and Federal Transit Administration Bicycle and Pedestrian Policies as well as the DOT, HUD and EPA Grant Announcements that are specifically designed for livability and promoting just Smart Growth.

#### Slide 17: Joint FTA and FHWA Programs

Andrea Martin: Joint FTA and FHWA programs that are great for the community. And the Website is down below here. We have the Transportation Planning Capacity Building Program and this peer program is a comprehensive training in assistance to the local government. They can – we can help you with the land use planning, scenario planning if you would like station development or transit-oriented development, as well as operations management, analysis methods. These are just some of the assistance that we can provide to you from FTA.

What you do is you go online and you can fill out an application. It doesn't just have to be these programs; it could be additional things like air quality. The – if that was something that you needed to work on, transportation control measures with your transit agency, we would – we could help you through this program to do that.

#### Slide 18: FTA Livability Programs Include:

Andrea Martin: FTA's livability programs include transit systems such as buses, subways, light rail, commuter rail, street cars, monorail, ferries and people movers. There's community development where neighborhoods are made more safe and healthy and environmentally sustainable through transit programs, and formula and discretionary which are competitive grants. And I'm going to talk a little bit about that further in the presentation.

#### Slide 19: FTA Formula Funds

Andrea Martin: OK, we have FTA formulas funds. What that means is money is set aside, put together in a formula through application and you're able – or the transit agency or the community, the MPO would be able to apply for the grant. We have urbanized areas formula grant program that is for areas of 50,000 or to 200,000 in – or urbanized areas between 50,000 and 200,000 in population.

Funding can be used for planning, engineering design, evaluation of transit projects and other transportation-related studies. Funding can also be used for capital investments in buses and bus-related activities such as the replacement, overhaul and rebuilding of buses. For urbanized areas with populations of 200,000 or more, at least one percent of the funding apportioned to each area must be used for transit enhancement activities such as your historic preservation, landscaping, public art, pedestrian access, bicycle access, and enhanced access with persons – for people with disability.

Rail and Fixed Guideway Modernization, basically, this program provides funding through the formula and the fixed guideway refers to any transit service that uses exclusive or controlled rights-of-way of rail entirely or in part. The term includes heavy rail, commuter rail, light rail, monorail, a trolley bus, an aerial tramway, inclined plane, cable car, an automated guideway, transit ferryboats, a portion of a motorbus service operated on exclusive or controlled rights-of-ways such as your bus rapid transit or high-occupancy vehicle (HOV) lanes. Funds can be used to modernize or improve existing fixed guideway systems, and you may have heard the term State of Good Repair.

We also provide assistance to rural and small urban areas and rural transit assistance programs where we hope the rural area – make the community more accessible to the residents.

#### Slide 20: Competitive Funding for Transit

Andrea Martin: There is also competitive funding here at FTA. We have several applications or the Notice of Funding Availability are out there and people have applied and these are just ongoing programs. We have a Bus and Bus Facilities program, and basically it provides capital assistance for new and replacement buses, related equipment and facilities as well as intermodal transit centers.

And we also have something called New and Small Starts, and this is a discretionary program that the federal government supports the planning and development and construction of major transit fixed guideway capital projects. These are areas that have not had transit before. They're either an urbanized area such as – Tina mentioned Phoenix, with the braking system; that was a New Start program, the light rail there. A Small Start is going to be a small area – a small urban area or rural area that has not had transit before. And so then application is out there right now and it's due July 12th.

We also have the TIGGER program which is Transit Investment for Greenhouse Gas Reduction, and they're awarded to public transit agencies for the implementation of new strategies for reducing greenhouse gas emissions and reducing energy usage from their operations. And the TIGGER application for this new round of applicants, there's \$75 million to be disbursed among applicants, and it's going to be August 11th.

There's also the Transit in the Parks program. And this program protects sensitive areas, the national parks, forest, wildlife refuge and other federal lands; basically improves the visitor experience for public transportation and alternative transportation. And it's a partnership that we have with the Department of the Interior and the Forest Service, and it funds expenses for

alternative transportation systems such as shuttle buses and bicycle trails in our national parks and public land. And, basically, you can look for the funding availability of these types of programs at the Website on the Webinar here as well as the program descriptions at our Website at FTA.

#### Slide 21: Transit Serving Target Populations

Andrea Martin: And basically, through public transportation, we provide transport for elderly persons and people with disabilities. We provide the Job Access and Reverse Commute Program and New Freedom Formula Grant Program. And the New Freedom Grant Program, it's a program that provides additional tools to overcome barriers for Americans with disabilities. So these are all areas to help that population.

#### Slide 22: Center for Transit Oriented Development

Andrea Martin: OK. Earlier, we talked about transit-oriented development. It's development along transit and it provides best practices, research tools and support market-based, transit-oriented development, partners with both public and private sectors to strategize about ways to encourage the development of high performing transit-oriented development projects around transit stations and to build transit systems that maximize the development potential. It's a program funded through FTA and you can get that information from the Center for Transit-oriented Development at [reconnectingamerica.org](http://reconnectingamerica.org).

#### Slide 23: Thank You!

Andrea Martin: This is our contact information if you have any questions or any – on any specific program, whether it be a grant program or the Department of Transportation's Climate Change Initiative and livability. Thank you. Anything else, Tina?

Emma Zinsmeister: Thank you, Tina and Andrea.